Name: …………………………………………………………… Date: ……………………

YEAR 9 MATHEMATICS

Statistics and Probability

Directed investigation
(Folio task)

Content Strand:

Purpose:

The purpose of this assessment is to display your understanding and knowledge in relation to the topic: Statistics and Probability. You will be required to carry out mathematical calculations in a variety of contexts.

Description of assessment:

Individually, students will need to research data associated with a range of statistics collected by the Australian Bureau of Statistics. They will use this raw data to analyse and make predictions about phenomenon that are being studied.
Students will have one week to complete the assessment task.

Instructions – Part A – Making predictions.

1. In the table below, indicate how many hours you spent per week on the following activities:

Activity	ABS code	Hours I spent on activity last week
Hours with Friends	HrFrnd	
Hours on Homework	HrHmeWrk	
Hours with Family	HrFamily	
Hours doing Sport	HrSport	
Hours playing Video Games	HrVidGame	
Hours on Computers	HrComp	
Hours watching TV	HrTV	
Hours in Paid Work	HrPayWrk	
Hours in Voluntary Work	HrVolWrk	
Hours doing House Work	HrHseWrk	

2. Previously, you were asked to collect 100 samples of data about Eye colour, Favourite foods and how students get to school.
   Now you are to collect **100 samples** on how students spend their free time. The question you are going to try and solve is this:

   Is it possible to predict what Year 10 students do in their free time based on data from students in Year 8?

3. You are to go to the Australian Bureau of Statistics site that you were on recently
   (Go here for the link: http://www.csiro.au/helix/mathsbyemail/activity/average.html).

4. The Reference Year is 2010.
   Select data by question.
   Choose Q26 (Weekly activities)
   Sample size of 100.
   All states and territories
   Year level – Year 8
   Sex – all and get sample data. Save this and add it to your report as Appendix A.

5. Create a table where you find the mean number of hours for each of the activities mentioned in the table above [hint: create your own table!]

6. Go back to the data sampler and follow step 4 above BUT this time choose Year Level:10. Save this and add it to your report as Appendix B.

7. Again, create a table where you find the mean number of hours for each of the activities mentioned in the table.

8. Combine the data in the tables from step 5 and 7 above into one table and convert them into a suitable chart [your choice – be prepared to explain why you chose this type of chart]

9. Use this information to write a report (see details below).

Part 2 – Is there any relationship between height and hand-span.

10. *It is a commonly held belief that the height of each person should be the same as their arm span. We are going to use the data from the ABS to see if this is correct.*

11. Go back to the ABS Sampler page.

12. The Reference Year is 2010.
    Numerical data [Note: this is different to what we have done up until now].
    Sample size of 100.
    All states and territories
    Year level – Year 9

13. Download the file and look for two sets of data:
    Q09.Height and Q11.ArmSpn. (Save this and add it to your report as Appendix C).

14. Find the mean of both sets of data. Are they the same?

15. Present the raw data in a suitable chart (X:Y scatter is good but I will allow you to choose the best way to COMPARE the data).

16. Use this information to write a report (see below).

You need to write a report on your findings using the following structure:

Title
Make the title useful and helpful to the reader

Introduction – [CMI 3 – comprehensive introduction**]**

1. Introduce the problems – hint there are two of them!
2. Give an overview including any initial thoughts about the problems and include any predictions you would make about these problems.
3. Describe the methods you will use to solve the problems.

Analysis and discussion – [MKSA 2 – the means are calculated using technology**; MMP2** – accurate means**; MMP 3 –** strategies to calculate means are clearly set out.**]**
This includes:
Part A: *[make sure all tables and charts have titles, labels and units where applicable]*

1. Table summarising the total number of hours YOU spend on the activities mentioned.
2. The Table of Results for means for Year 8 students.
   Include HOW you calculated the means.
3. The Table of Results for means Year 10 students.
4. The combined Table of results for means for Year 8 and 10 AND
5. The combined Chart used to illustrate the results.

Part B: *[make sure all tables and charts have titles, labels and units where applicable]*

6. The means for Height and Arm span – please make sure this data is clearly presented.
7. Chart comparing the Height and Arm span raw data.

Conclusions/assumptions/limitations – [MMP 4 – interpretation is relevant**]**

1. Summarise your findings for Part 1 and Part 2 in paragraph form – use actual data to back up your statements.

   How do these results compare with **your** preferences/ your height and arm span?

2. For both questions:
   a. Do you think that you would get the same results if we were able to survey ALL students in Australia at these Year levels?
   b. Name three problems with surveying all students.

3. For Part 1 of the results (Hours spent on different activities), what do your results mean to:
   a. Principals in a school?
   b. Parents?
   c. The Government of Australia?

4. You were asked to present the data in chart form. Explain why **each** chart is the best way to present this data. That is, why were they useful?

5. In Part 2, there may have been some data that was unusual. For example, one student had a height of 179 cm but a hand span of 800 cm; another had a height of 168cm but a hand span of 67cm.
   a. How might this affect your calculations of the mean?
   b. What do we call this type of data?
   c. What should we say about such data in our conclusions?

You may do a rough draft in your book but the final copy must be done on paper and handed OR through Google Docs. Don't forget to add the Appendices of raw data.

Due date:

Performance Standards for Year 9 Mathematics – Directed Investigation

	Mathematical Knowledge and Skills and Their Application	Mathematical Modelling and Problem-solving	Communication of Mathematical Information
A	Effective understanding of mathematical concepts. Correct use of mathematical techniques and formulae to solve most operations in complex questions (with/without technology). Accurate application of knowledge to solve real life and theoretical problems.	Clear investigation, development and application of mathematical models. Clear and accurate solutions to mathematical problems set in real life and theoretical situations. Effective strategies to solve equations and proofs. Relevant interpretation of results/comparisons of data	Detailed communication of mathematical ideas and reasoning to describe solutions/patterns using correct terminology. Accurate use of appropriate notation and units. Comprehensive introduction of the task including a description of the problem and methods used.
B	Mostly effective understanding of mathematical concepts. Mostly correct use of mathematical techniques and formulae to solve most operations in complex questions (with/without technology) Mostly accurate application of knowledge to solve real life and theoretical problems.	Relevant investigation, development and application of mathematical models. Mostly clear and accurate solutions to mathematical problems set in real life and theoretical situations. Mostly effective strategies to solve equations and proofs. Mostly relevant interpretation of results/comparisons of data	Sound communication of most mathematical ideas and reasoning to describe solutions/patterns using mostly correct terminology. Mostly accurate use of appropriate notation and unit. Clear introduction of the task, including a description of the problem and methods used.
C	General understanding of mathematical concepts. General use of mathematical techniques and formulae to solve most operations in complex questions (with/without technology). General application of knowledge to solve real life and theoretical problems.	General investigation, development and application of mathematical models. Generally clear and accurate solutions to mathematical problems, set in real life and theoretical situations with some errors General use of strategies to solve equations and proofs. General understanding and interpretations of results/comparisons of data	General communication of mathematical ideas and reasoning to describe solutions/patterns using generally correct terminology. General uses appropriate notation and units. Brief introduction of the task, similar to what is written in the investigation.
D	Minimal understanding of mathematical concepts. Minimal use of mathematical techniques and formulae to solve questions. Minimal application of knowledge to attempt to solve mathematical problems.	Simple investigation of mathematical models. Inconsistent solutions to mathematical problems. Minimal use of strategies to solve equations and proofs. Minimal understanding of results/comparisons of data	Minimal communication of mathematical ideas. Minimal attempts to use appropriate notation and units. Introduction copied from the investigation.
E	Limited understanding of mathematical concepts. Limited use of mathematical techniques. Limited application of knowledge to attempt to solve mathematical problems.	Limited investigation of mathematical models. Minimal attempt to solve mathematical problems. Limited use of strategies to solve equations and proofs. Limited understanding of results/comparisons of data	Limited communication of mathematical ideas. Limited attempt to use appropriate notation and units. Only the title of the task written.
I	Incomplete understanding of mathematical concepts. Incorrect use of mathematical techniques. Incorrect application of knowledge to solve mathematical problems.	Incomplete investigation of mathematical models. Incorrect solutions to mathematical problems. Incorrect use of strategies so solve equations and proofs. Incorrect understanding of results	Inconsistent communication of mathematical ideas. Incorrect use of notation and units. No title, no introduction.